

UK Patent Application GB 2 268 361 A

(43) Date of A Publication 05.01.1994

(21) Application No 9310109.5

(22) Date of Filing 17.05.1993

(30) Priority Data

(31) 04147930 (32) 15.05.1992 (33) JP

(51) INT CL⁵
H04M 11/00

(52) UK CL (Edition M)
H4K KOF

(56) Documents Cited
GB 2201065 A US 4899370 A US 4841562 A

(58) Field of Search
UK CL (Edition L) H4K KOC KOE KOF
INT CL⁵ H04M

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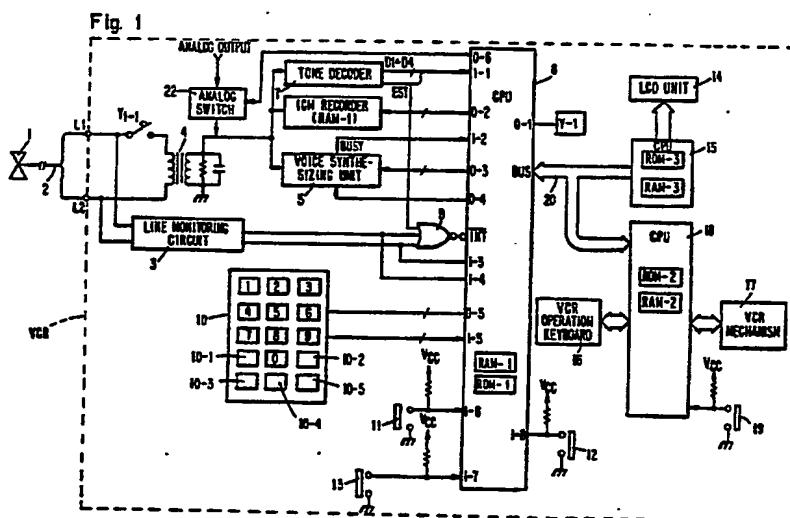
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(54) Device for determining residual quantity of videotape

(57) A user may confirm the residual quantity of videotape via voice synthesis by employing the residual quantity calculating function 19, which is built into the videocassette recorder, when an outside telephone is used to enter TV program reservations. If a plurality of TV program reservations have already been entered at this time, the total amount of time required for recording the TV programs to be newly entered via telephone is calculated as well as the previously entered TV programs based on the reservation data (recording start time, length of recording time, etc.), and announced to the user via voice synthesis whether recording can actually be done.



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

Fig. 1

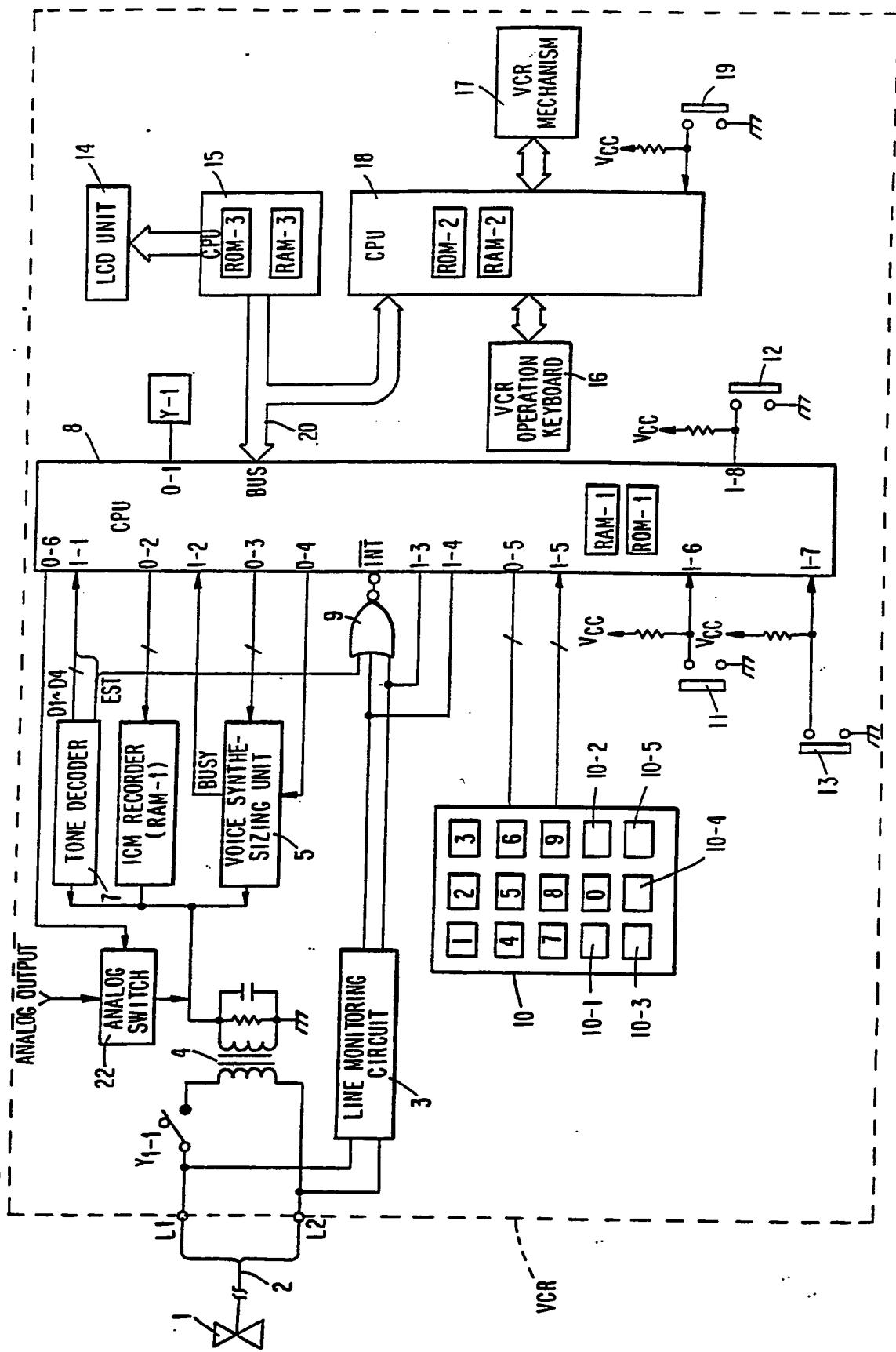


Fig. 2

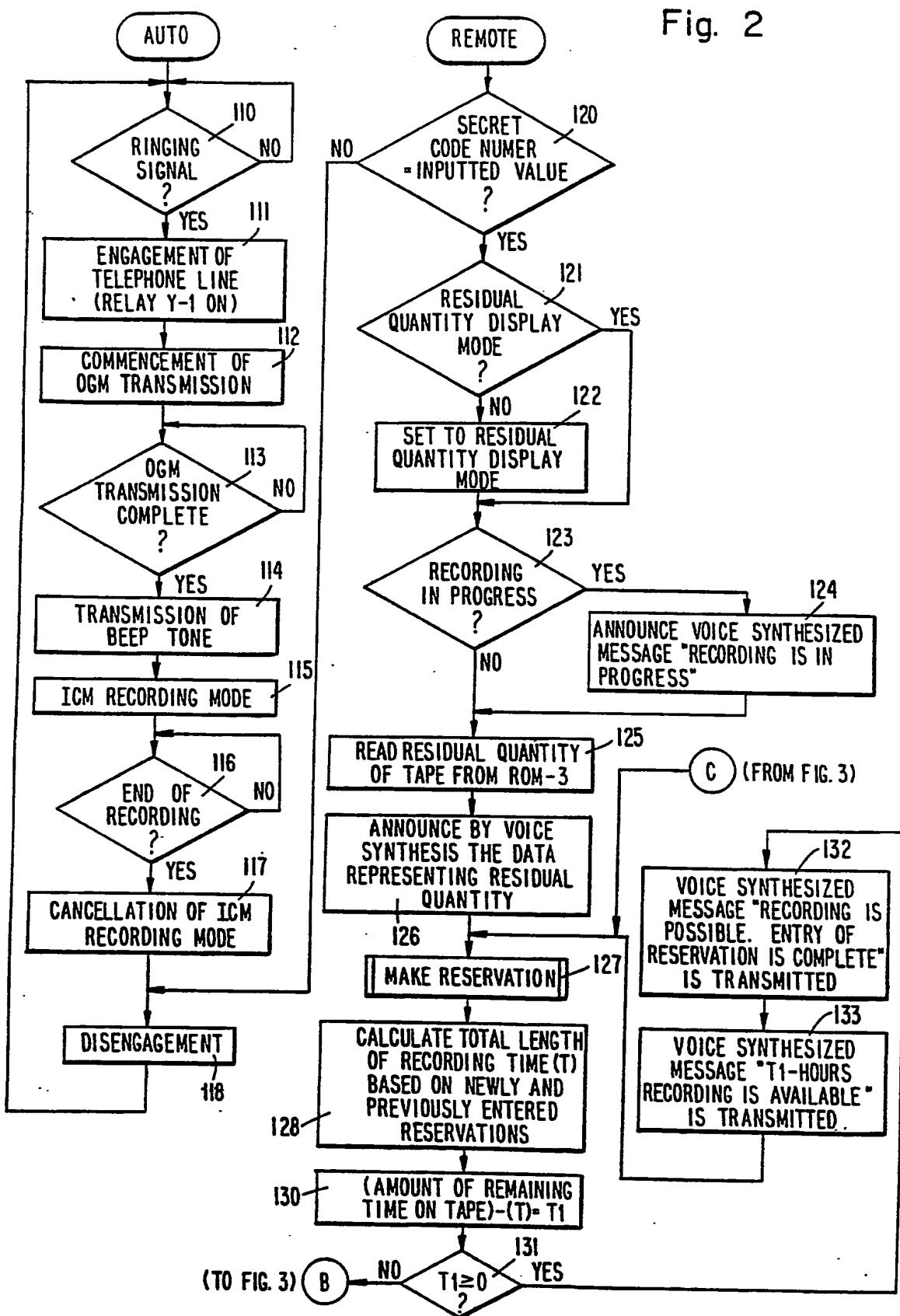
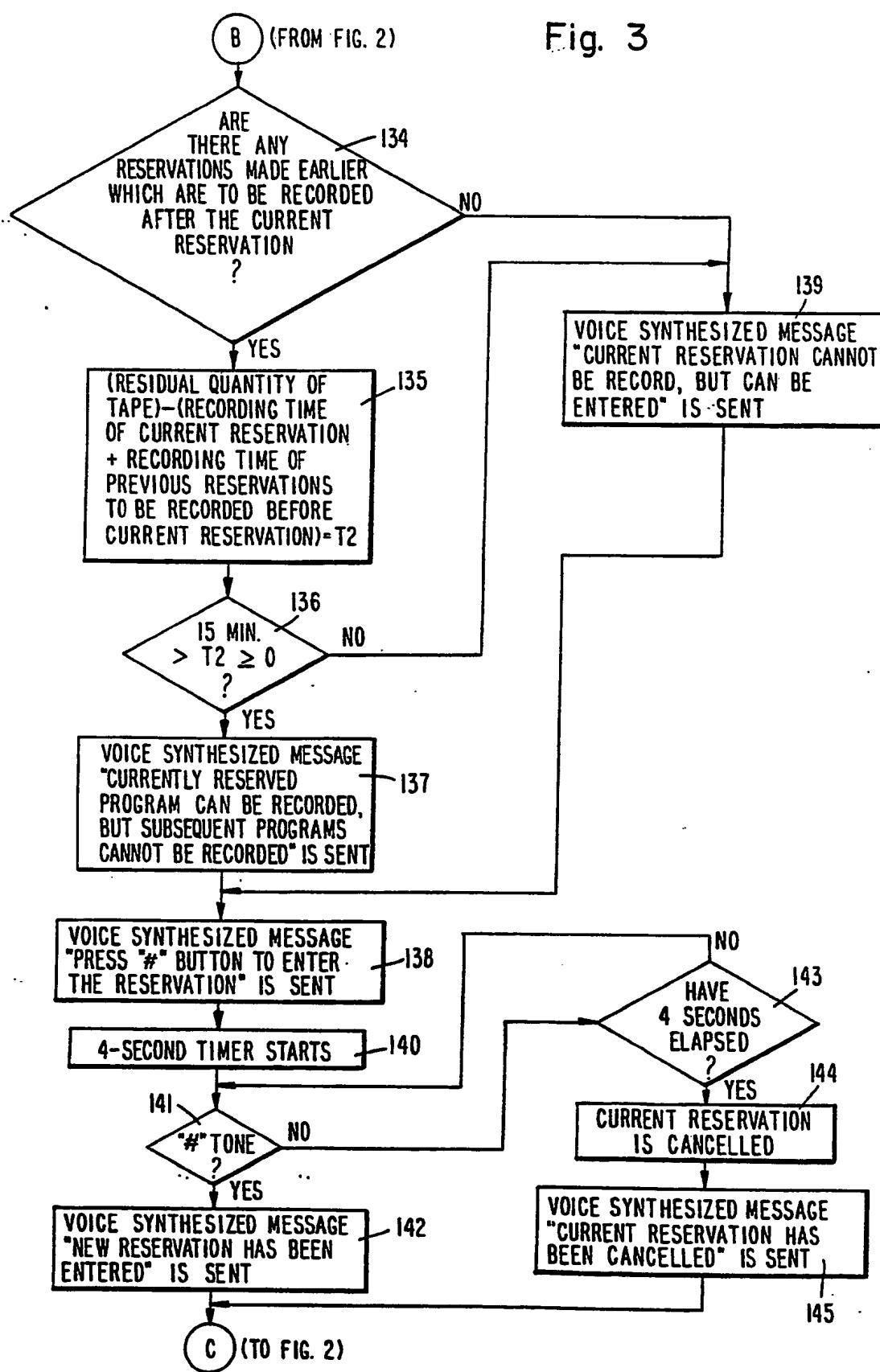


Fig. 3



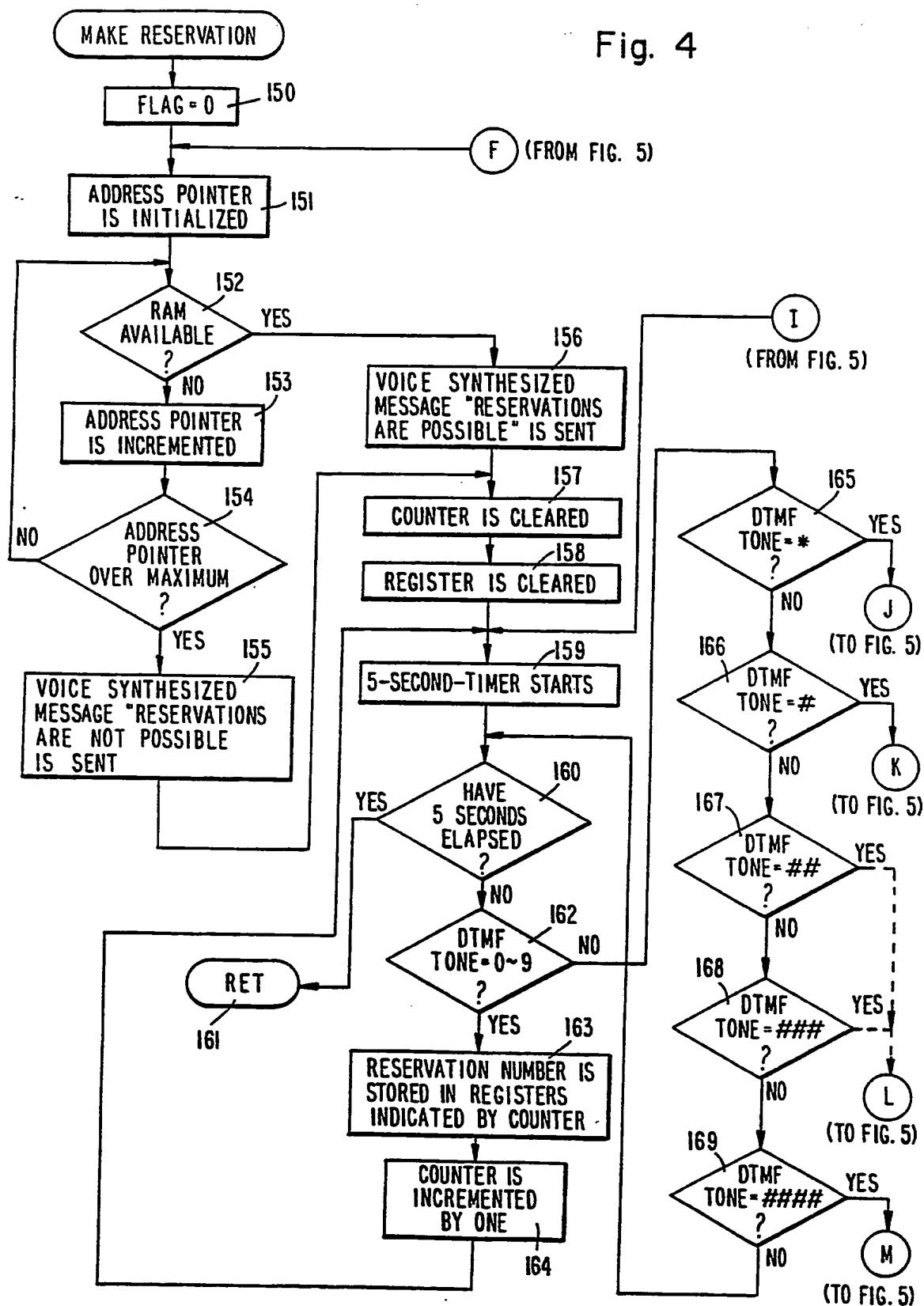
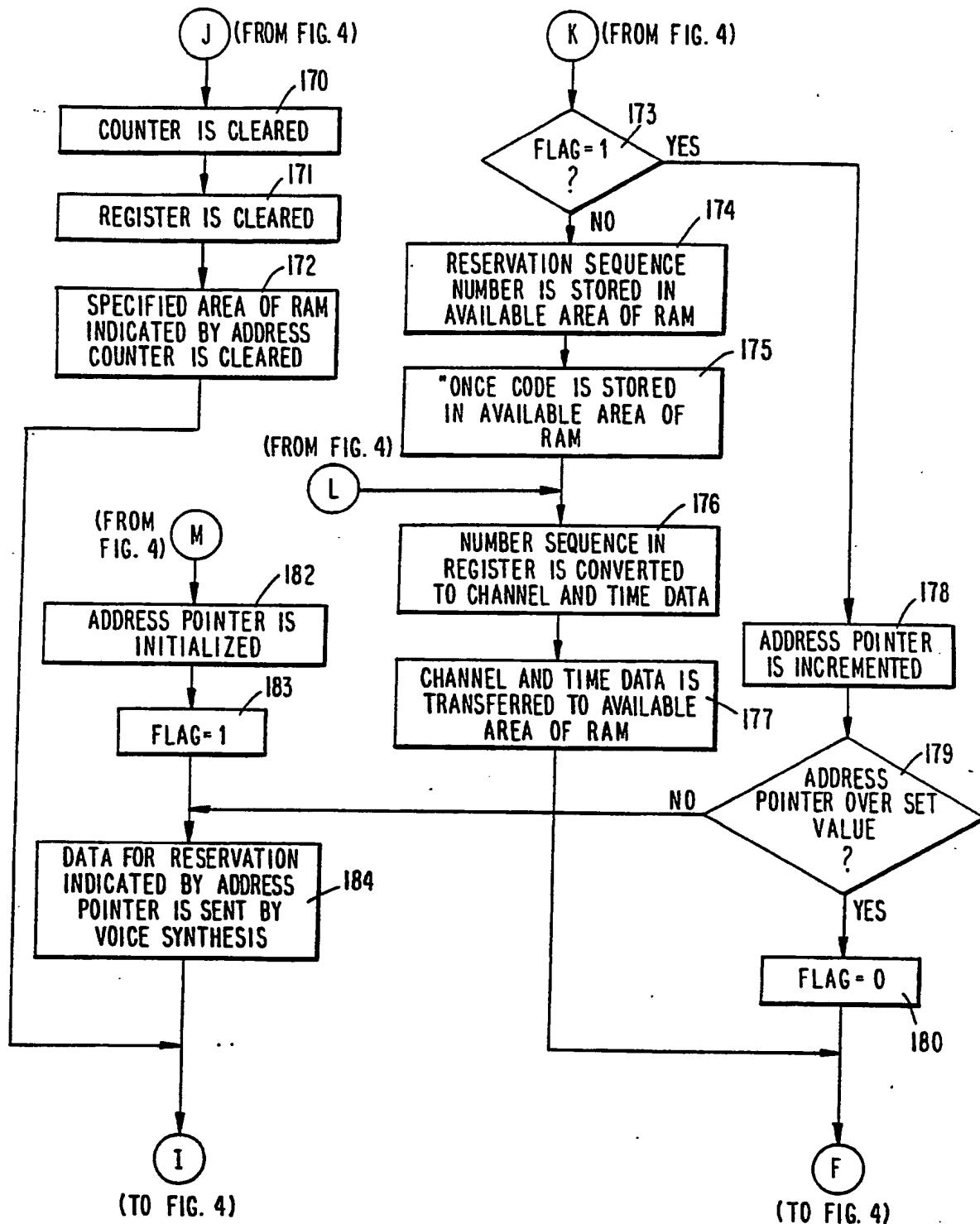


Fig. 5



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Fig. 6

ADDRESS	R A M		
n	0	1	RESERVATION SEQUENCE NUMBER
n + 1	0	0	"ONCE" CODE
n + 2	1	0	CHANNEL (IOCH)
n + 3	0	1	RECORDING START TIME (MONTH)
n + 4	0	4	RECORDING START TIME (DAY)
n + 5	2	0	RECORDING START TIME (HOUR)
n + 6	0	0	RECORDING START TIME (MINUTE)
n + 7	2	0	LENGTH OF RECORDING TIME
n + 8	0	2	RESERVATION SEQUENCE NUMBER
n + 9	0	2	"WEEKLY" CODE
n + 10	0	3	CHANNEL
n + 11	0	1	RECORDING START TIME (MONTH)
n + 12	0	4	RECORDING START TIME (DAY)
n + 13	1	8	RECORDING START TIME (HOUR)
n + 14	0	0	RECORDING START TIME (MINUTE)
n + 15	2	0	LENGTH OF RECORDING TIME

Fig. 7

"ONCE" CODE	0 0
"DAILY" CODE	0 1
"WEEKLY" CODE	0 2

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Fig. 8

RESERVATION KEYBOARD	REMOTE CONTROL SIGNAL
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0
ONCE	#
DAILY	##
WEEKLY	###
CANCEL	*
REVIEW	####→#

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DEVICE FOR DETERMINING RESIDUAL QUANTITY OF VIDEOTAPE

Background of the Invention

The present invention relates to a device which enables the user to confirm the residual quantity of videotape when TV program reservations are entered into a videocassette recorder (VCR) by using an outside telephone.

In the past, there were no means for determining the residual quantity of videotape when entering TV program reservations into a VCR via telephone; thus, TV program reservations were entered with the residual quantity of videotape being a matter of conjecture.

Summary of the Invention

The present invention is directed to provide a means to enable the confirmation of the residual quantity of videotape by using voice synthesis.

The present invention enables the user to confirm the residual quantity of videotape via voice synthesis by employing the residual quantity calculating function, which is built into the VCR, when an outside telephone is used to enter TV program reservations. Also, when a plurality of TV program reservations have already been entered, the present invention calculates the total amount of time required for recording the TV programs to be newly entered via telephone as well as the previously entered TV programs based on the reservation data (recording start time, length of recording time, etc.).

and announces to the user via voice synthesis whether recording can actually be done.

Brief Description of the Drawings

Fig. 1 is a block diagram representing an embodiment of the present invention.

Fig. 2 is a flowchart describing operations which take place when the VCR is set to an "Absent" mode and TV program reservations are entered by remote control.

Fig. 3 is a flowchart describing operations which take place when the VCR is set to an "Absent" mode and TV program reservations are entered by remote control.

Fig. 4 is a flowchart describing subroutines used by the flowcharts in Figure 2.

Fig. 5 is a flowchart describing subroutines used by the flowcharts in Figure 2.

Fig. 6 is an explanatory drawing illustrating one example of the TV program reservation data which would be stored in a RAM.

Fig. 7 is an explanatory drawing illustrating one example of a "Once" code, "Daily" code, and "Weekly" code.

Fig. 8 is a table showing comparison of the pushbutton operations for the reservation keyboard used while at home and the keypad of an outside telephone used for entering TV program reservations by remote control.

Guide to Numbers Used in Figure 1

1. Telephone set
2. Telephone line
3. Line monitoring circuit
4. Line transformer
- 30 5. Voice synthesizing unit
6. ICM recorder
7. Tone decoder
8. CPU

10. Keyboard
11. Reservation button
12. "Execute Reservation" button
13. "Absent" button
- 5 14. LCD (liquid crystal display) unit
15. CPU
16. VCR operation keyboard
17. VCR mechanism
18. CPU
- 10 19. Residual quantity of videotape display button

Preferred Embodiment of the Invention

Figure 1 is a block diagram showing one embodiment of the present invention. Only the major components concerning this invention are shown. Number 1 refers to an outside telephone and 2 to a telephone line. The symbol VCR refers to a videotape recorder. The embodiment is constructed from the components as described below.

Number 3 refers to a line monitoring circuit for detecting a ringing signal and for detecting a voltage change on the telephone line when the caller places telephone 1 on hook. Number 4 refers to a line transformer for connecting the telephone line and VCR. Number 5 refers to a voice synthesizing unit which transmits by voice synthesis an outgoing message to callers in response to incoming calls; instructive messages to specified callers concerning how to make TV program reservations via telephone line 1; informative messages to specified callers about reservations that were made; and the like. Number 6 refers to an ICM recorder which records incoming messages from callers. These incoming messages are stored in RAM-1.

Number 7 refers to a tone decoder for decoding DTMF tones which represent remote control signals sent by specified callers. Number 8 refers to a one-chip CPU

(microprocessor). Symbols I-1 through I-8 refer to input ports and symbols 0-1 through 0-6 to output ports. The symbol INT refers to a terminal used for interruption. The symbol BUS refers to the input/output terminal for signal conductors, such as data bus, address bus, write conductor, and readout conductor. These conductors are used for transmission and reception of data to and from other CPUs (CPU 14 and CPU 18) via multiple bus line 20. One-chip CPU 8 contains both the ROM into which the program is written and the RAM (see Figures 6 and 7) into which the information about TV program reservations is stored.

Number 10 refers to a keyboard which is used for making reservations of TV programs. The "0" through "9" refer to buttons for inputting numbers. "Cancel" button 10-1 is for cancelling TV program reservation data. "Review" button 10-2 is for confirming the above reservation data on LCD unit 14. "Weekly" button 10-3 is for entering the reservation of a TV program to be recorded at the same time every week. "Once" button 10-4 is for entering one-time recording information. "Daily" button 10-5 is for entering the reservation of a TV program to be recorded daily from Monday through Friday. Number 11 refers to the "Make Reservation" button which is pressed whenever keyboard 10 is used to reserve TV programs.

Number 12 refers to the "Execute Reservation" button (usually called the "Timer Recording" button). Number 13 refers to the button to press when the VCR is to be set to the "Absent" mode. The symbol Y-1, which is a load on output port 0-1, refers to a relay used to engage the telephone line and has contact y1-1. As evident from the diagram, the various components described above are controlled by CPU 8.

Number 14 refers to a LCD unit using liquid crystal. Number 15 refers to a CPU which manages the display of

data from CPU 8 and CPU 18, this data consisting of TV program reservation information and conventional operation modes of the VCR.

5 Number 16 refers to a keyboard which is used to operate the VCR functions ("Play," "Rewind," etc.). Number 17 refers to the VCR mechanism. Number 18 refers to a CPU for controlling the above VCR operation keyboard 16 and VCR mechanism 17. Number 19 refers to a residual quantity of videotape display button. The technology involved in displaying the residual quantity of videotape is public knowledge.

10 The operations concerning remote reservation of TV programs will now be explained by reference to the flowcharts of Figures 2 through 5. When this device is set to the "Absent" mode by pressing the "Absent" button 13 of Figure 1, the following becomes possible: an outgoing message is transmitted in response to calls from third parties; incoming messages from third parties can be recorded; and TV program reservations can be performed via remote instructions from the owner of the device while away from home.

15 When "Absent" button 13 is pressed, the subroutine "AUTO" shown in Figure 2 is called. Although it is not shown on the flowchart, if the caller has forgotten to press the above "Absent" button before leaving home, the "Absent" mode can be set by allowing the audible ringing signal to ring ten-odd times.

20 At Step 110, the ringing signal is detected by the program via line monitoring circuit 3 and input port I-3. When the ringing signal is identified as such, Step 110 becomes affirmative and the actuation of relay Y-1, which is a load on output port 0-1, causes the engagement of the telephone line via contact y1-1 and line transformer 4 (Step 111). Consequently, the ringing signal stops, and a communication mode between the caller and the VCR is established.

One of the outgoing messages (OGMs) stored in voice synthesizing unit 5 is selected according to a command from output port 0-3, and the above outgoing message (OGM) is outputted in response to a start signal from output port 0-4 (Step 112). The output of the BUSY terminal is tested via input port I-2 in order to determine the end of the OGM's transmission (Step 113).

When the transmission of this outgoing message has concluded, Step 113 becomes affirmative and after a beep-tone is sent by voice synthesis (Step 114), the device switches to the incoming message recording mode in response to a command from output port 0-2 (Step 115). The caller's incoming message is stored in RAM-1 of ICM recorder 6 via telephone line 2 and line transformer 4. When this storing concludes, Step 116 becomes affirmative. Then, the recording mode is cancelled (Step 117), the telephone line is disengaged (Step 118), and the device is reset to the standby mode of Step 110.

Next, operations will be described in which the owner uses outside telephone 1 to enter TV program reservations remotely during the above mentioned "Absent" mode.

During the "Absent" mode, the owner transmits a secret code number in order to be able to make reservations. This code number consists of DTMF tones generated from the pushbutton operation of Telephone 1. When the beginning of these tones is detected by tone decoder 7, the subroutine "REMOTE" of Figures 2 and 3 is called.

At Step 120, a test takes place to determine whether the number entered through keyboard 10 is the same as the above secret code number (3 to 4 digits). If it is not the same, the program is restored to standby mode (flowchart connector A). If it is the same, Step 120 becomes affirmative. At Step 121, a test occurs to determine whether the device has been set to the mode for

displaying residual quantity of videotape (hereinafter called "Display" mode). Although the means to display the amount of remaining tape is public knowledge, for purposes of clarity it will be described. In this 5 embodiment, if the residual quantity of videotape display button were already pressed while the user were at home, the device would be set to the "Display" mode. More specifically, if a prescribed bit in RAM-2 of CPU 18 is set to "1" ("flagged"), the program stores the fact that 10 the "Display" mode is in effect. However, when the device is not set to the "Display" mode, transmission of the secret code number causes CPU 8 to send a command to CPU 18 via multiple bus line 20, whereby the aforementioned bit is set to "1." Consequently, the 15 device is set to the "Display" mode (Steps 121 and 122). VCR mechanism 17 moves the videotape (not shown) a small amount and calculates the residual quantity from the amount of revolutions of the reel (not shown).

At this time, because the residual quantity of 20 videotape changes during recording, a test takes place at Step 123 to determine whether recording is in progress. If it is recording, the message, "Recording is in progress," is transmitted (Step 124).

The figure representing the residual quantity of 25 videotape is stored in RAM-3 temporarily for the purpose of display. This data is read (Step 125), and then a voice synthesized message such as, "Four-hour-recording available," is transmitted (Step 126).

At Step 127, the subroutine "Make Reservation," 30 which is shown in Figures 4 and 5, is called. First the flag (FLAG) is cleared and the address pointer is initialized (Steps 150 and 151). Then at Steps 152, 153 and 154, a test takes place to determine whether there is enough memory (see Figure 4). The result is announced by voice synthesis (Steps 155 and 156). The register and counter, which are built in CPU 8, are then cleared 35

(Steps 157 and 158) and the timer (e.g. five seconds) is started (Step 159).

5 The caller (owner) then transmits, in a prescribed sequence, information concerning channel, recording start time, length of the recording time, etc. for TV program reservations by pushbutton operation of Telephone 1.

10 There are various reservation methods, for example, a method of entering a numerical value, such as "100104200020," which would represent a channel ("10"), a recording start time (January 4 = "0104"; 8:00 p.m. = 20:00 = "2000"), and length of the recording time (2 hours = "20"); and a method of increasing the recording length by 30 minutes every time the pound (#) key of Telephone 1 is pressed. In this embodiment, however, a 15 method requiring only the input of a numerical sequence known as a G-code (in the United States, Plus-code or the like), which has a maximum of eight digits, will be described.

20 If a DTMF tone is entered during the running of the timer, the timer length is reset to five seconds (described below). If a DTMF tone does not arrive within these five seconds, Step 160 becomes affirmative, and this subroutine "Make Reservation" is cancelled (Step 161).

25 If a DTMF tone arrives within five seconds, Step 160 becomes negative, and a test takes place at Step 162 to determine whether this tone is one of the numbers "0" through "9." Obviously, as a recording reservation number is composed of numbers (for example, "1742"), Step 30 162 becomes affirmative. By means of a loop consisting of Steps 160, 162, 163, 164 and 159, this recording reservation number is stored digit by digit in the respective registers indicated by the counter (Step 163 and 164).

35 If the user presses the pound (#) key one time (see Figure 8) after this recording reservation number is

5 inputted, Step 166 becomes affirmative via Steps 162 and 165. Following flowchart connector K, the program advances to Step 173 of Figure 5, at which time a test is performed to determine whether FLAG is set to "1." Here
10 the FLAG is set to "0," so that Step 173 becomes negative. Then, the number representing the reservation's position in the sequence of reservations ("reservation sequence number"), a binary code representing "Once" reservation ("Once" code), and binary codes representing the channel and time data of the TV program to be recorded, are stored into a predetermined location in the available area of RAM at Steps 174, 175, 176 and 177. Next, the program returns to Step 151, at
15 which time a search takes place for the available area of RAM in which the next recording reservation data is stored.

20 After the caller inputs the next recording reservation number, he or she may make daily records by pressing the "#" key two times consecutively, and weekly recordings by pressing the "#" key three times consecutively as shown in Figure 8 (the details of these operations are omitted).

25 Calling up this device, in the above manner, from a remote location is mainly for TV program recording reservations, but other functions also can be executed as described below.

30 For example, if the user presses "#" key four times consecutively, the present device is set to "Review" mode. Then the reservation data stored in RAM is read sequentially and announced by voice synthesis, so that the user can verify what he or she has reserved. (Once in "Review" mode, it is not necessary to press "#" key four times, just once will suffice.) Input of four consecutive "#"s causes Step 169 to become affirmative.
35 The address pointed is initialized at Step 182 (flowchart

connector M), and then the aforementioned FLAG is set to "1" at Step 183.

At Step 184, the reservation data indicated by the above-mentioned address pointed is transmitted by voice synthesis, for example, "Reservation Number 1 begins on January 4th at 8:00 p.m. Length of the recording time is 2 hours. It is a one-time recording." The program then returns to Step 159. If a "#" is input once within 5 seconds, the program advances to Step 166 via Steps 162 and 165. After Steps 166 and 173 become affirmative, the address pointer is incremented in order to read out the data for the next recording reservation at Step 178. As long as this address pointer does not exceed a set value, Step 179 remains negative and the data for the next recording reservation is converted into voice and transmitted at Step 184. By repeating such operations, it is possible to verify all the recording reservation data that has been stored in RAM.

If an unnecessary recording reservation is announced, the data may be deleted by pressing the asterisk ("*") key. More specifically, when the caller inputs an asterisk, a test takes place at Step 165 to determine whether the DTMF tone represents an asterisk. After Step 165 becomes affirmative, the counter and register are cleared, respectively, at Steps 170 and 171. Then the specified area of RAM indicated by the address pointer is also cleared (Step 172). In the above manner, the unnecessary reservation announced by voice synthesis may be completely deleted.

After making a single TV program recording reservation in the manner described above, if the device is left as it is for more than five seconds (waiting state), Step 160 becomes affirmative and the subroutine is cancelled at Step 161. The program then returns to Step 128 of Figure 2. At this step, the total time required for recording (T) is calculated based on a newly

entered reservation and the reservations that have been entered earlier.

For example, assume that the reservations set for a given day are made for 10:00-11:00, 12:00-13:00 and 18:00-19:00 using the timer (for explanatory reasons, this example differs from the aforementioned one). Also assume that a two-hour videotape which has been rewound to the beginning is being used and the tape deck is set to SLP (super long play) recording mode so that six hours of programming may be recorded on this normally two-hour tape. Next, assume that while away from home, the user reads a newspaper and decides to record another program. He calls up the device at approximately 2:00 in the afternoon and makes a reservation for 20:00 to 22:00. At this time, there are two hours of recording on the tape consisting of the one-hour recording from 10:00 to 11:00 and the one-hour recording from 12:00 to 13:00. Therefore, at the previously mentioned Step 126, there are four hours of remaining tape. Because there is a one-hour-recording from 18:00 to 19:00 and because the remote reservation being made at this time is two hours long, the total length of required recording times (T) is three hours. Incidentally, with regard to the total length of recording time, it is possible that there may be a recording reservation which comes after the time reserved by remote control. In such a case, that time would also be included.

At Step 130, the total required recording time, which was determined at Step 128 (T), is subtracted from the residual quantity of the videotape, which was determined at Step 125, in order to get the result T1 (in this example, one hour). If this T1 is greater than zero, it is possible to make a recording which includes the part just reserved by remote operation. In other words, when T1 is greater than zero, Step 131 becomes affirmative and the voice synthesized message, "Recording

5 is possible" is transmitted at Step 132. Also, when this T1 is greater than zero, new reservations of duration T1 or less are possible. At Step 133, the voice synthesized message, " T1-hour-recording available," is transmitted. The program then returns to Step 127 so that the next reservation may be performed.

10 On the other hand, if the above Step 131 becomes negative, in other words, when it is not possible to record all of the day's reservations including a reservation which has just been made by remote operation, tests take place beginning at Step 134 to determine whether at least that particular reservation can be recorded. Assume, for example, the owner leaves in the morning with one hour's worth of videotape having already 15 been played. Also assume that he calls at 2:00 p.m. as stated above, at which time the six-hour tape includes the already mentioned one hour, plus the 10:00 to 11:00 period and the 12:00 to 13:00 period which have since been recorded. Thus, there are three hours of consumed 20 tape. Later, one hour's worth will be recorded from 18:00 to 19:00 as stated above. Therefore, the amount of tape remaining on or after 19:00 is two hours and the TV program from 20:00 to 22:00, which was reserved via remote telephone at 2:00 p.m., still can be recorded. 25 However, if there is another reservation, for example, from 23:00 to 23:30, the reservation cannot be recorded on the above-mentioned videotape.

30 Thus, if there is a reservation from 23:00 to 23:30, Step 134 becomes affirmative, and at Step 135 the time which has just been reserved (2 hours) plus the previous recording time (18:00 to 19:00 or one hour) will be subtracted from the time remaining on the tape (in this example, three hours). Let T2 represent this remaining value. If T2 is, for example, greater than or equal to zero but less than 15, it is possible to record the times 35 18:00 to 19:00 and 20:00 to 22:00. Step 136 then becomes

affirmative, and at Step 137 the following voice synthesized message is transmitted: "The TV program you have just reserved can be recorded, but any subsequent TV programs cannot be recorded."

5 Next, the voice synthesized message, "To enter the reservation, press the "#" key," is transmitted at Step 138. At this time, the caller decides which TV program ("20:00 to 22:00" or "23:00 to 23:30") should be recorded. Then the four second timer is started (Step 140). If the caller presses the "#" key within four seconds, Step 141 becomes affirmative, and at Step 42 the voice synthesized message, "Your new reservation has been entered," is transmitted. The program then returns to Step 127 (flowchart connector C). If the caller hangs up, the present device will soon be reset.

10 If, on the other hand, at Step 141, four seconds pass without the caller pressing the "#" key, Step 143 becomes affirmative. Then information on the new reservation ("20:00 to 22:00") indicated by the address pointer is deleted just as if the previously mentioned "*" key had been pressed (Step 144). At Step 145, the voice synthesized message, "The new reservation has been deleted," is transmitted.

15 If the aforementioned Step 136 is negative, after the message, "The reservation you have just made cannot be recorded, but can be entered," is transmitted at Step 139, another message, "To enter the reservation, press the pound key," is transmitted at Step 138. If there is someone at home who is able to put another tape in the VCR and the caller presses the "#" key at Step 138, the new reservation is entered via Steps 141 and 142. The program then returns to Step 127 and the present device is soon reset.

20 Taking account of the possibility that there will be someone at home to load a new tape into the VCR when the tape reaches the end, the present device is constituted

such that when output from VCR mechanism 17 indicating the end of the tape is read at CPU 8 via CPU 18 and bus line 20, a light emitting diode (LED) flashes (or an alarm sounds), whereby the person at home is informed of the tape reaching the end. Therefore, he or she changes the videotape and merely presses "Execute Reservation" button 12 (normally called the "Timer" button).

Next, the operations mentioned above will be summarized and described as follows:

- 10 1. Using an outside telephone, the device is called up.
- 15 2. As this device has a telephone answering device built into it, the device first operates as a telephone answering device (TAD).
- 20 3. The 3 to 4 digit secret code number is inputted by the user while the device is operating as a TAD. If the number is the same as the secret code number, the residual quantity of tape will be calculated and the value will be transmitted by a voice synthesized message: for example, "Four hours of recording time are available."
- 25 4. A test takes place to determine whether there is enough RAM available for storing the reservation data. If there is enough RAM, the voice synthesize message, "Reservations can be made," will be announced.
- 30 5. In order to make a reservation, the caller transmits information regarding channel, recording start time, length of recording time, etc. In this instance, G-codes are used to represent this information.
- 35 6. In this device, if one "#" is received after the information on a reservation, a one-time only ("Once") reservation is made. If two "#"s are received, a "Daily" reservation is made; if three, "Weekly".

7. After one reservation is concluded, the device calculates the total number of recording hours required by the current reservation and the previously made reservations which are to be recorded before and after the recording start time of the current reservation. The total number of recording hours required is compared with the residual quantity of tape that was discussed in the above Step 3. If the residual quantity of tape is greater than the total amount of recording time required by the current and previous reservations, the recordings can take place, and the voice synthesized message, "Recordings can take place," is announced. Also, as a result of the above calculation, the message, "You can still make "X" hours of reservations," is announced and additional reservations may be accepted. If no new reservations are required, the caller may just hang up the phone.

8. On the other hand, if the above Step 7 cannot materialize, or if, in other words, not all the reserved TV programs can be recorded on a single tape, a search takes place to determine whether there are any previous reservations which are to be recorded before and after the recording start time of the current reservation made by phone. Depending on the result of the search, one of the following two messages may be announced: "The TV program you have just reserved may be recorded. Any subsequent TV programs cannot be recorded. Please press the "#" key to enter the reservation." or "The current reservation cannot be recorded, but can be entered. To enter the reservation, please press the "#" key."

The latter message, "...cannot be recorded, but can be entered...." is useful when there is someone at home to change the tape.

5 The present device can be called up by the user using an outside touch-tone telephone and, based on this push-button operation, allows the caller to confirm the current residual quantity of videotape by having it announced via the voice synthesizer. Also, this device allows its user to confirm through the above-mentioned 10 telephone the residual quantity of the videotape available for a new reservation when a plurality of TV program recording reservations have been entered, by transmitting from the voice synthesizing unit the above-mentioned residual quantity of the videotape calculated 15 based on the search of the various recording data (recording start time, length of recording time, etc.). The present invention overcomes the deficiency of the prior art in which new reservations would be partially recorded or not recorded at all when multiple 20 reservations have already been entered or recorded. Thus, it makes recording reservations a reliable procedure. The present invention, therefore, has a great practical effect.

CLAIMS

5 1. A device for determining the residual quantity of videotape by remote control comprising:

 means for receiving a ringing signal from a telephone line and accepting a secret code number;

10 means, to be connected to said acceptance means when said secret code number is identical to a previously inputted number, for calculating the residual quantity of

videotape used for TV program recording reservations or the like; and

15 means for transmitting the residual quantity of videotape by voice synthesis to the telephone line.

2. A device for determining the residual quantity of videotape by remote control as set forth in claim 1 comprising:

20 means for testing whether there is enough vacancy in memory to enter TV program reservation data for videocassette recorded (hereinafter called VCR); and

 means for transmitting a voice synthesized message such as, "Reservations are now possible," or the like when there is vacancy in said memory.

25 3. A device for determining the residual quantity of videotape by remote control as set forth in claim 1 comprising:

30 means for transmitting a voice synthesized message such as, "Reservations are now possible," or the like when a figure representing the residual quantity of videotape is greater than a figure representing total length of recording time; and

35 means for transmitting a voice synthesized message such as, "Recording cannot be done," or the like when a figure representing the residual quantity of videotape is less than a figure representing total length of recording time.

4. A device for determining the residual quantity of videotape remaining in a video cassette recorded (VCR) by remote control over a telephone line, comprising:

5 first means for receiving a ringing signal and a secret code number from a caller over the telephone line and determining whether the secret code correspond to a prescribed secret code;

10 second means enabled when the secret code corresponds to the prescribed secret code for determining a residual quantity of videotape remaining in the VCR; and

15 means for transmitting to the caller information on the residual quantity of videotape.

5. The device of claim 4, wherein said transmitting means includes a voice synthesizer unit for transmitting voice information to the caller.

6. The device of claim 5, wherein said second means further includes means for receiving from the caller data representing a TV program reservation.

20 7. The device of claim 6, wherein said second means further includes means for determining whether there is enough residual quantity of videotape in the VCR to record a TV program corresponding the TV program reservation, and means for controlling the voice synthesizer unit to transmit a corresponding voice message, such as "Reservations are now possible" to the caller.

25 30 8. The device of claim 6, wherein said second means further includes means for determining whether the residual quantity of videotape in the VCR is sufficient to record TV programs previously and currently reserved by the caller, and controlling the voice synthesizer unit to transmit a corresponding voice message, such as "Reservations are now possible" to the caller.

9. The device of claim 4, wherein said second means includes means for calculating the total length of 5 recording time available on the videotape in the VCR.

10. The device of claim 6, wherein said second means includes a memory unit, means for testing said memory unit to determine whether there is sufficient memory capacity remaining in said memory unit to store 10 said TV reservation data, and means for controlling said voice synthesizer unit for transmitting a voice message, such as "Reservations are now possible" when the memory capacity is sufficient.

11. The device of claim 6, wherein said second 15 means includes means for calculating when the residual quantity of videotape in the VCR is greater than the total quantity required to record reserved TV programs, and means for controlling said voice synthesizer unit to transmit a voice message, such as "Recording cannot be 20 done" when the calculated residual quantity is less than the required total quantity of videotape.

12. The device of claim 6, wherein said TV reservation data are in the form of "G-codes."

13. A method for determining the residual quantity 25 of videotape remaining in a video cassette recorder (VCR) by remote control over a telephone line, comprising the steps of:

receiving a ringing signal and a secret code number from a caller over the telephone line;

30 determining whether the secret code corresponds to a prescribed secret code;

when the secret code corresponds to the prescribed secret code, determining a residual quantity of videotape remaining in the VCR; and

35 transmitting to the caller a voice synthesized message describing the residual quantity of videotape.

14. The method of claim 13, including the additional steps of

receiving from the caller data representing a TV program reservation;

5 determining whether there is enough residual quantity of videotape in the VCR to record a TV program corresponding the TV program reservation, and transmitting a corresponding voice message to the caller.

10 15. The method of claim 13, including the additional steps of

10 16. determining whether the residual quantity of videotape in the VCR is sufficient to record TV programs previously and currently reserved by the caller, and transmitting a corresponding voice message to the caller.

15 17. The method of claim 13, wherein said step of determining includes calculating the total length of recording time available on the videotape in the VCR.

17. The method of claim 13, including the additional steps of

20 25 testing a memory unit to determine whether there is sufficient memory capacity remaining in said memory unit to store said TV reservation data, and

transmitting to the caller a voice message, such as "Reservations are now possible" when the memory capacity is sufficient.

18. The method of claim 13, wherein said step of determining includes calculating when the residual quantity of videotape in the VCR is greater than the total quantity required to record reserved TV

5 programs, and including the additional step of

transmitting to the caller a voice message, such as "Recording cannot be done" when the calculated residual quantity is less than the required total quantity of videotape.

10 19. A broadcast recording apparatus comprising a memory, means for receiving via a telephone line from a user the identity of a desired broadcast which would require a specified amount of memory, means for comparing the storage capacity remaining in said 15 memory with said specified amount of memory and means for informing the user via said telephone line as to whether or not there is sufficient storage capacity remaining in said memory to record said desired broadcast.

20 20. A broadcast recording apparatus comprising a memory, means for receiving via a telephone line from a user a request for information concerning the amount of storage capacity remaining in said memory, means for determining said information and for 25 communicating the same to the user via said telephone line.

21. Apparatus as claimed in claim 19 or claim 20 further comprising a security memory for storing a security number, said apparatus being operable to communicate information to the user only after receiving from the user via said telephone line a security code bearing a predetermined relationship to said security number.

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22. A device for determining the residual quantity of videotape by remote control substantially as hereinbefore described and/or with reference to the accompanying drawings.

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23. A method for determining the residual quantity of videotape remaining in a video cassette recorder (VCR) by remote control over a telephone line substantially as hereinbefore described and/or with reference to the accompanying drawings.

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Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

GB 9310109.5

Relevant Technical fields

(i) UK CI (Edition L) H4K: KOC; KOE; KOF

(ii) Int CI (Edition 5) H04M

Search Examiner

AL STRAYTON

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

20 JULY 1993

Documents considered relevant following a search in respect of claims 1-18

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X, Y	GB 2201065 A - page 5 lines 18,19 page 4, line 25, page 5 line 3	1-18
X, Y	US 4899370 - column 4 line 60 - column 5 line 47	1-18
X, Y	US 4841562 - column 4, lines 33-41	1-18



Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).